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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

REGION 5

9311 GROH ROAD

GROSSE ILE, MI 48138

MEMORANDUM

SUBJECT: Justification of application of Allied Paper OU-5 risk-based residential PCB cleanup number to OU-1 residential neighborhoods

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STATEMENT OF THE ISSUES

RPM Berkoff requested a review of pertinent reports from the Allied Paper Site to answer the following questions;

1. What are the inputs and equations used by TSCA to determine the PCB cleanup goal of 1 ppm?
2. Are the factors evaluated in the site-specific risk assessment commensurate with those used in TSCA evaluations?
3. What are the differences in the inputs or equations that result in MDEQ's 4 ppm residential number?
4. Is the PCB 2.5 ppm cleanup standard which was developed for OU-5 applicable to residential neighborhoods in OU-1?

RESPONSE

1. The TSCA PCB cleanup standard of 1 ppm, which is written in 40 CFR 761.61(a)(4)(i)(A), is based upon residential health-based cleanup goals. This number was calculated using an obsolete slope factor ($4.0 \text{ (mg/kg-day)}^{-1}$), which was established in 1987, for PCBs which is no longer used by the US EPA. The current PCB slope factors ($2.0 \text{ (mg/kg-day)}^{-1}$), which were established in 1997, have a greater degree of scientific validity since they have been developed using more recent peer-reviewed research. The slope factors are themselves peer reviewed and are agreed upon to be protective of human health. However, since 1 ppm is written into federal code, it has to be used for PCB cleanup unless a Risk-Based Disposal Approval Application is submitted to LCD which shows that a site-specific cleanup standard is more applicable to the site.

There is a caveat to this in Region 5. Region 5 has a delegation of authority in place between TSCA and Superfund which allows the Director of the Superfund Division to approve site-specific PCB cleanup levels at Superfund sites without a formal Risk-Based Disposal Approval as long as Superfund Division consults with the Director of the Land and Chemicals Division on the decision.

2. TSCA and Superfund use the same risk assessment guidance, exposure factors, and regional screening level tables (cancer and non-cancer endpoints) to determine risk at contaminated sites.
3. MDEQ Part 201 Soil Direct Contact Criteria states that TSCA cleanup levels for PCBs should be used (1 ppm). However, if TSCA rules do not apply (based upon 40 CFR 761 Subparts D & G), then 4 ppm is an appropriate cleanup level. This number is different from the current US EPA screening level of 0.22 ppm. US EPA screening levels are based upon a 1 in a million (1×10^{-6}) excess lifetime cancer risk from exposure to contaminants, whereas Michigan Direct Contact Criteria are based upon a 1 in 100,000 (1×10^{-5}) excess lifetime cancer risk. US EPA considers a residential exposure as 350 days per year for 70 years for all exposure pathways. Michigan's algorithms use 245 days for dermal exposure. US EPA uses a dermal absorption efficiency of 100% for PCBs, whereas Michigan uses a dermal absorption efficiency of 50%. These factors together determine the difference between US EPA screening levels and MDEQ Soil Direct Contact Criteria.
4. According to the approved 2003 Human Health Risk Assessment for OU-5, the following equation was used to derive the residential health-based soil cleanup number:

$$I = C * FC \left[\frac{(EF_i * IR_{soil} * AE_i) + (EF_d * DF * AE_d) + (EF_{inhal} * IR_{air} * AE_{inhal} (VF + PEF))}{AT * CF} \right]$$

Where;

I = Intake (mg/kg-day)

C = Concentration in the soil (mg/kg)

FC = Fraction in Contaminated soil (100%)

EF_i = Ingestion Exposure Frequency (350 days per year)

IR_{soil} = Ingestion rate of soil (114 mg-yr/kg-day)

AE_i = Ingestion Absorption Efficiency (1 unitless)

EF_d = Dermal Exposure Frequency (245 days per year)

DF = Dermal Factor (353 mg-yr/kg-day)

AE_d = Dermal Absorption Efficiency (0.14 unitless)

EF_{inhal} = Inhalation Exposure Frequency (350 days per year)

IR_{air} = Inhalation rate of air (7.52 m³-yr/kg-day/day)

AE_{inhal} = Inhalation Absorption Efficiency (1 unitless)

VF = Soil to Air Volatility Factor (7.3×10^{-7} mg/m³-air/mg/kg-soil)

PEF = Particle Emission Factor (6.9×10^{-12} mg/m³-air/mg/kg-soil)

AT = Averaging Time (25,550 days)
CF = Conversion factor (1×10^{-6} ug/kg)

Even though the equation above is not standard format, it was approved in the 2003 Human Health Risk Assessment. The assumptions used in the equation are consistent with US EPA assumptions.

The equations used to determine the regional screening levels or health-based cleanup levels are exposure specific and not operable unit specific. As an example, the equation cited above calculates an exposure based upon a person being at their home for 350 days per year for 30 years. Even if the operable units have different soil types, it would not affect the exposure parameters used to determine risk-based cleanup levels. Therefore, it is irrelevant if the person lives at OU-5 or OU-1. The residential cleanup level of 2.5 ppm of PBCs calculated in the 2003 Human Health Risk Assessment for OU-5 is valid as a site-specific cleanup goal for OU-1.